In the Claims:

1. (Currently Amended) A metal-to-metal antifuse formed over a lower Cu metal layer planarized with the top surface of a lower insulating layer comprising:

a metal layer disposed under and in physical contact with said Cu metal layer;

a lower barrier layer disposed over said lower Cu metal layer;

an antifuse material layer disposed over said lower barrier layer;

an upper barrier layer disposed over said antifuse material layer;

an upper insulating layer disposed over said upper barrier layer; and

an upper Cu metal layer planarized with a top surface of the upper insulating layer and having a contact extending therethrough to make electrical contact with said upper barrier layer.

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2. (Original) The metal-to-metal antifuse of claim 1 further including:

a first cap layer disposed over said lower Cu metal layer and the top surface of said lower insulating layer, said first cap layer having a first-cap-layer via formed therethrough exposing a top surface of said lower Cu metal layer, wherein said lower barrier layer is disposed in said first-cap-layer via in electrical contact with said lower Cu metal layer; and

a second cap layer enveloping said antifuse material layer and said upper barrier layer said second cap layer having a second-cap-layer via formed therethrough exposing a top surface of said upper barrier layer, wherein said upper Cu metal layer is disposed in said second-cap-layer via.

3. (Original) The metal-to-metal antifuse of claim 1 wherein said antifuse material layer comprises a layer of amorphous silicon.

4. (Currently Amended) The metal-to-metal antifuse of claim ~~1~~ 2 wherein said lower barrier layer comprises a layer of TaN, said lower barrier layer encladded in said first cap layer.

5. (Original) The metal-to-metal antifuse of claim 1 wherein said upper barrier layer comprises a layer of TiN.

6. (Previously Amended) The metal-to-metal antifuse of claim 2 wherein said first and second cap layers are formed from SiN.

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7. (Original) The metal-to-metal antifuse of claim 2 wherein said antifuse material layer comprises a layer of amorphous silicon.

8. (Original) The metal-to-metal antifuse of claim 2 wherein said lower barrier layer comprises a layer of TaN.

9. (Original) The metal-to-metal antifuse of claim 2 wherein said upper barrier layer comprises a layer of TiN.

10. (Currently Amended) A method for fabricating a metal-to-metal antifuse comprising:

forming a metal layer under and in physical contact with a lower Cu metal layer planarized with the top surface of a lower insulating layer;

forming a lower barrier layer over a lower Cu metal layer planarized with the top surface of a lower insulating layer;

forming an antifuse material layer over said lower barrier layer;

forming an upper barrier layer over the antifuse material layer;

defining said antifuse layer and said upper barrier layer;

forming an upper insulating layer over said upper barrier layer and said antifuse layer;

forming a via in said upper insulating layer to expose a top surface of said upper barrier layer;

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forming an upper Cu metal layer over said upper insulating layer and in said via to make electrical contact with said upper barrier layer; and

planarizing a top surface of said upper Cu metal layer and a top surface of said upper insulating layer.